

**AN ESSAY ON BREAD**

**BY H. JACKSON, Chemist**



A N  
E S S A Y  
O N  
B R E A D ;

W H E R E I N

The BAKERS and MILLERS are vindicated from  
the Aspersions contained in Two *Pamphlets* ;

O N E I N T I T L E D

P O I S O N D E T E C T E D :

And the other,

The N A T U R E of B R E A D honestly and  
dishonestly made.

P R O V I N G

The Impossibility of mixing *Lime, Chalk, Whiting*  
and *burnt Bones* in Bread, without immediate  
Discovery.

W I T H

Plain and Easy Experiments to discover *Alum* and other  
Admixtures in Bread, instantly.

To which is added,

An A P P E N D I X ; explaining the vile Practices  
committed in adulterating Wines, Cider, Porter,  
Punch, Vinegar, and Pickles.

W I T H

Easy Methods to detect such A B U S E S .

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By H. J A C K S O N, C H E M I S T .

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—*Sed ignotis perierunt mortibus illi.*

HOR.

*Who dares think one Thing, and another tell,  
My Heart detests him as the Gates of Hell.*


Pope's Hom.

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L O N D O N :

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A

# NEW TREATISE

ON

## BREAD.



THE Observations which I made some Years ago on the various Mal-Practices committed by those whose Business it is to prepare the public Viands, had almost determin'd me to publish my Sentiments thereon ; but Time not permitting me to make some Experiments previous to such a Work, I drop'd the Design ; till a few Months ago, being importuned by a very eminent Physician to try some Experiments, and deliver him my Sentiments thereon, I resumed the Subject : But just at the Time I was endeavouring to analyze Bakers Bread, I was agreeably surpris'd to find by the public Papers that my intended Business was anticipated by a Physician ; the Dignity of whose Profession, I flattered myself, would add Authority to his Arguments, and attract the public Attention more than any Thing I might advance ; being sensible of my own Insufficiency as

an Author. I purchased the Treatise, and acknowledge that the Contents not only surprised, but amazed me, when I reflected on the perfidious Arts of Bakers in dealing such silent Destruction amongst their Fellow Creatures. I had scarcely ever suspected any of the Villainies mentioned by this Author and asserted as undoubted Facts, and the Alarm determined me to be satisfied of the Truth. Ten Years ago I conceived an Aversion to *London Bread*, on account of the Alum, which, a Baker ingenuously informed me, was frequently used in the Composition; this Confession influenced me so much, that, since that Time, I have confined myself to a very inconsiderable Quantity, having dispensed with Greens, Roots and Salads as a Substitute. A very singular Instance confirmed my Prejudice against Bread: A Friend of mine, a great Fancier of *Canary-Birds*, had lost a great Number of those innocent, harmonious Creatures, which he attributed to the Salt in Bread, <sup>gated</sup> very fine together with Eggs boiled hard, for their Diet in Breeding; this Composition was frequently disposed to turn sour, from whence he infer'd the tender Brood might be griped and consequently destroy'd: I informed him, to his Surprise, that the ill Effects might more probably be ascribed to the pernicious Quality of Alum baked in the Bread; he exchanged his Baker, and preserved the remaining Stock: But I have been since convinced, that the Mischief arose from the Acidity the Bread had contracted by lying too long in Leaven, which frequently ensues in warm Weather, especially when the

Yeast



Yeast is bad, notwithstanding the Vigilance of the Baker. But altho' Alum principally occasioned my Dislike to Bread, yet I never suspected that Lime; Chalk, Whiting, and burnt Bones were any of its constituent Parts : Certainly the most servile abandon'd Wretch could not be ignorant of the pernicious Effects arising from such odious Admixtures; the Practice of which would render him more detestable and dangerous than the lurking Assassin.

I find, however, that the Assertions of this Author are not implicitly to be depended upon. I know not who he is ; but whoever he is, I shall endeavour to demonstrate, that his malevolent Suggestions have occasioned more Mischief by exciting Doubts and Mistrusts, and inflaming the Minds of the People, than can possibly arise from the contaminated Bread of the Bakers

I expected, at least, that the Author would have confirmed his Observations by a Set of useful Experiments, whereby the Public might avoid the *detected Poison* and the ABUSES OF BAKERS ; but on the contrary, I was amused with a speculative Disquisition of the medicinal Properties of Alum, Lime, &c. and instead of the *Abuses of Bakers*, was entertained with a physical ABUSE OF BAKERS.

As the Bakers are principally aimed at in this Pamphlet, it being doubtless intended to extirpate, as well as expose their pretended Villainy, the Style should have been plain and familiar, as a literary Education is not essentially necessary to their making of Bread ; and others of a superior Class have been

not a little perplexed to investigate the true Meaning of some hyperbolic Expressions, of which the first twelve lines afford such an Example, that a Baker at his Club, expressed great Concern, that the Book was not translated into *English*. This Reflection I hope will sufficiently plead for the Simplicity of Diction in the following Sheets, which are published with a View to ascertain the Purity and Impurity of Bread, thereby to calm the Perturbations of the Publick, and to convince them how injuriously the Bakers have been treated by the two Authors upon Bread; not only on account of the Falsity of Accusations, but by branding them with the most unparallel'd Infamy.

I shall endeavour to confirm my Observations with plain and easy Experiments, whereby every Individual may readily distinguish good Bread from bad; which Method must certainly redress the Grievance more effectually than the Execution of all the penal Laws in force. What Man will eat Lime or Alum mixed with Bread, if he knows how to detect it? If he is ignorant, let Experiment teach him.

*Some Truths are not by Reason to be try'd,  
But we have sure Experience for our Guide.*

DRYDEN,

The Author of *Poison detected*, tells us in Page 7th, ' That good Bread, that most substantial and ' principal Part of human Food, ought to be ' composed of Flour well kneaded with the lightest ' Water, season'd with a little Salt, fermented with ' fine Yeast or Leven, and sufficiently baked with  
' a pro-



‘ a proper Fire. But instead of this wholesome  
 ‘ Bread, the Craft of iniquitous Bakers has found  
 ‘ out a more advantageous Method of making this  
 ‘ Food, by the mischievous Admixture of many  
 ‘ pernicious Ingredients to increase its Weight, and  
 ‘ deceive the Buyer by its fraudulent Fineness.  
 ‘ Lime, Chalk, Alum, &c. (meaning Whiting  
 ‘ and burnt Bones) mix’d up with Flour, Yeast,  
 ‘ Salt, and Leaven, in certain Proportion, are  
 ‘ constituent Parts of that most common Food, to  
 ‘ which, in the City of *London*, the deluded Inha-  
 ‘ bitants give the Name of Bread.’

Such daring Assertions are suitable to the Character of an anonymous Author ; but had he informed us what that Proportion is, it would have been more satisfactory ; for my own Part, I have not been able to investigate the least Proportion of any foreign Ingredients in Bread, except Alum ; I have carefully examined the Bread of more than a hundred different Bakers, and have been unable to discover the least Particle of Lime, Whiting, &c. and I am pretty certain that if any of their Bread had been mixed with only a minute Portion of such Substances, it could not have escaped my Researches. But it is absolutely impossible for either Miller or Baker to add any such Materials to Flour and Bread without an immediate Discovery ; for if Lime, Whiting, Chalk, or burnt Bones, be ever so finely powder’d, nay levigated, and mixed with Bread, yet they will manifest themselves by a Grittiness in the Mouth. I am not insensible of the Grittiness of Flour occasioned by the Negligence of the Miller, for when the Mill-

Mill-Stones are worn smooth, they are obliged to clear and repair them with proper Tools; and if the sandy Particles are not perfectly swept away, the Flour which is next ground proves gritty. The Miller could not grind the Ingredients sufficiently fine amongst the Wheat, and the gross Particles of any of them would pass the Cloth with the Flour; the Bakers would soon discover the Fraud in setting their Sponge, as they phrase it, and it would be visible enough in the finer Puffs of the Pastry-Shops. Besides, if such Ingredients cost nothing, and the Baker is capable of the Villainy, yet the Expence of powdering, sifting, or otherwise rendering them fine, would thus prove more expensive than Flour at the present extravagant Price. This wou'd be making the Cure worse than the Disease; a Practice more frequent amongst *Physicians* than Bakers.

Admit the Possibility of these Mixtures, to what Purpose could they tend? If they are practis'd with a View to increase the Weight of Bread, and to save an equal Proportion of Flour, large Quantities must be us'd, and if the Proportion of one to \* six be the Standard, the Bread would turn out so gritty, that the very Dogs would spurn it, and the Eye might perceive it without Assistance, in the hard Surface of a Loaf; as Experience will convince any incredulous Person.

The Baker's Profits could not be increas'd with such ridiculous Substitutes. Such dry absorbent Earths, introduc'd to supply the Diminution of Flour,



Flour, do not retain the Moisture of the Water us'd in making the Dough ; for when influenc'd by the Heat of the Oven, the Bread attracts their aqueous Parts which they contracted in the Mixture ; and thus they remain intermix'd, but unchang'd in the Bread, like so many Particles of Sand ; for they by no Means unite and incorporate with the farinaceous Parts of the Flour.

Good Bread when bak'd, appears thro' a Glass like a Honeycomb, full of Cells, yet the intermediate Parts constitute a homogeneous Substance of a gelatinous Nature, which readily unites with an aqueous Menstruum, whilst the incoherent Particles of Lime, Chalk, &c. in Bread, are only dispersed up and down in an insoluble State.

Flour mix'd with Whiting, in the Proportion of six to one, and bak'd, does not turn out near the Weight of Bread under the same Circumstances, as good Flour without such Admixture would do ; and it is a known Maxim amongst Cooks as well as Bakers, that if two Puddings be separately made with an equal Weight of good and bad Flour, and bak'd together in the same Oven for an equal Time, that the Pudding of good Flour will weigh considerably heavier than that of bad Flour ; this is entirely owing to the inherent Property of good Flour, which retains its Moisture more advantageously ; hence the Addition of dry insoluble Ingredients, with a Design to save Flour and increase Weight, appears as unnecessary as it is ridiculous, since the better the Flour, the less is sufficient ; which is not only a Saving, but a Credit to the Baker.



If then it be suspected that Bones, Lime, Chalk and Whiting, are added to increase the Whiteness of Bread, whoever practises such stupid Methods will be deceiv'd; for such Substances communicate a pale ghastly Colour to Bread rather than White, and by contracting the cellular Substance, will give it a very unsaleable Appearance.

When Alum is mix'd in a certain Proportion with such Materials, and bak'd in Bread, it greatly prevents that close Union of Parts; for in this Case the Acid of the Alum unites with a Portion of such chalky Earths, which it dissolves, but during the Conflict generates a great deal of Air, which being expanded by the effervescent Heat, endeavours to escape thro' the glutinous Mass; by these Means, in Conjunction with the Yeast the Paste is puffed up, and thus render'd more spungy than when Allum is omitted; but notwithstanding this Effect, it alters the Colour of the Bread considerably for the worse; for the Acid of the Allum being thus speedily destroy'd by the Chalk, &c. adds to the Spunginess, whilst the Chalk destroys the Colour: Bread thus made, appears of a faint Olive Colour.

Alum bak'd in Bread without such Additions, produces a quite different Effect: The Bakers generally fix the Proportion of four Ounces of Alum to 100*lb.* Weight of Flour; if a much greater Proportion is added, the Colour and Texture of Bread is rather injur'd by it, than improv'd: This seems an inconsiderable Quantity, when we calculate the Increase of Weight which Flour gains when made into Bread; perhaps there is not so much

much as thirty Grains in a Quartern Loaf; I am certain by Experiments, the Quantity must be trifling.

Since Alum, then, is the only foreign Article which Bakers use with a Design to meliorate Bread made with indifferent Flour, let us take a Survey of its constituent Parts, that we may be the better enabled to ascertain its Effects on the human System. The Alum used by Bakers, is that Sort which is made in *England*; conscious of the Fraud, they generally buy it at some Distance from their Neighbourhood, most frequently at the Oil-Shops, under some cant Name of their own Invention, *as Stuff, &c.*

All Chemical Authots allow it to consist of a chalky Earth, united with a vitriolic Acid, hence its austere astringent Taste; Urine is poured upon it in its Preparation, to separate its more gross terrestrial Parts, by which means it obtains its crystalline Transparency; this is what the anonymous Bread-Doctor hints at, when he tells us, to remember it to be an Extract from human Excrement; but Alum retains a very minute Portion of that, compared with its other component Parts, and if it did, the volatile Salt of Urine is not such an odious disgusting Ingredient as he endeavours to represent.

These are the obvious constituent Parts of Alum; which taken internally in a crude State, and continued for some Time, may undoubtedly occasion various Diseases according to the Doctor's speculative Description; but in order to understand what may be advanc'd upon this Subject hereafter,

and to convey an Idea of the Nature of Alum to the meanest Capacity, it will be necessary to prove these to be its constituent Parts by Experiment.

Take a clear Solution of Alum in Water, put it into a Glass, and add to it, by Degrees, a clear Solution of any alkaline Salt, as Salt of Tartar, Pearl-Ash, &c. as it is drop'd in, white Clouds begin to appear, occasion'd by the earthy Basis of the Alum now separating, and a faint urinous Smell will arise, which lasts but a very short Time, and the Earth, by standing, will subside to the Bottom of the Glass, in exceedingly fine white Powder, called the *Magnesia* of Alum.

In this Process, the vitriolic Acid of the Alum, having greater Affinity with the alkaline Salt than with its own Base, attracts the former, and lets go the latter; and, at the same Instant, a very small Portion of a volatile urinous Salt in the Alum is set at Liberty, by the Conflict, which manifests itself by the Smell; while the Acid of Alum, now united to the fix'd alkaline Salt, constitutes a neutral Salt called Tartar of Vitriol; which will more evidently appear if the Point of Saturation be exactly perform'd, and the clear supernatant Liquor be decanted, evaporated, and set to chrySTALLIZE in the usual Manner.

The Produce of Wheat in 1756, was not only scanty, but very indifferent; it would neither grind nor bake well; the Misfortune was occasioned by the continued Rain at the Approach of Harvest, which level'd it to the Ground, and dispos'd it to sprout before it could be dry'd and hous'd, and by this means it was greatly divested of its Quintessence;



tessence ; the Bakers could not make their Bread appear tolerable with the Flour, not with all their *Bones, &c.* This induc'd the Bakers to use a larger Proportion of Alum, for the Bread would neither ferment kindly in Leaven, nor rise in the Oven without it ; but turn'd out as if it had been mix'd with one Third of Rye-Meal. The Alum improv'd the Colour and Texture, yet the Crumb of the Bread was very harsh, and the List, as the Bakers term it, was not of that peculiar fine brown Colour, (the Characteristic of Bread made with good Flour) and the Angles of the upper and lower Crusts appear'd close, as if they were glued together ; which are convincing Proofs of a superabundant Quantity of Alum in any Bread : But on the contrary, the Harvest was so genial the following Year, that I am well inform'd a Baker can make a Quartern-Loaf of the same Weight, with half a Pound less of the last Year's Flour, than with that of the preceding Year ; which confirms a former Remark, that good Flour retains its Moisture so advantageously, as to render the suspected Practise of Adulteration ridiculous. But notwithstanding the last Year's Flour makes excellent Bread without Alum, yet as the People in general prefer the whitest, (which they ignorantly conceive to be the only Mark of its Purity) the Bakers are compell'd to use a small Admixture of Alum to please the Fancy of their Customers, rather than lose them. Thus their private Interest surmounts publick Admonition. In this Case, the Buyer is equally culpable, as the Whiteness is his Pride as well as the Baker's. However, one

happy

happy Circumstance attends good Flour, that a much less Portion of Alum is sufficient to procure the white Colour and Texture so much admir'd in Bread ; for a greater Quantity diminishes them.

Bakers in general acknowledge the Use of Alum in Bread, and they alone, probably, will reap the Fruits of their Industry ; especially if the Invention of Hand-Mills succeeds, and the Parish Ovens be authoriz'd by Parliament.

It is greatly to be wish'd, some salutary Statute might oblige the Bakers entirely to abolish the Use of Alum ; since no material Advantages attend its Use, but what may more prudently be dispensed with : And altho' I am certain, the trivial Quantity bak'd in Bread, cannot greatly prejudice the Constitution, or occasion those Mischiefs attributed to crude Alum, yet to silence the clamorous Invectives of the People, excited by the ignorant and superficial Arguments, and mistaken Observations of the recited anonymous Author, it would appear much more laudable in the Bakers to associate themselves with a View to inflict an adequate Punishment on all future Delinquents, rather than attempt to injure the Health of their Fellow-Creatures, by the Choice of their daily Bread.

Good Flour yields Bread sufficiently white, without any artful Admixture ; but Brown Bread simply made, merits the Preference, as it digests easier and nourishes better. In this Point, I must coincide with the aforesaid Author's Opinion, with this Difference only, that Brown Bread would be rather more eligible, if a third Part of the Bran was rejected ; which is the general Practice in several

veral Counties in *ENGLAND*; for there is no Necessity for a Tour to *ITALY* to learn the Method.

It cannot be too strenuously recommended to the Bakers, to attempt the making this Sort of Family Bread, since it is certainly more wholesome than white, and would repeal the Suspicion of admixing Lime, Chalk, Whiting, and burnt Bones in Flour; which indeed could never be suggested, except by those, who, to favour an idle Hypothesis, have imposed upon Truth so far as to subject themselves to a public Reproach and Ridicule: For if the inordinate Concupiscence of Lucre had induced the Confederate Bakers to debase the public Bread with such deleterious Additions, this vast Metropolis must have groaned under such a horrid Depopulation ere now, that the surviving Few in vain might seek the Remnant of the College of Physicians to investigate the morbidiferous Principle, or a Chemist to analyze the lethiferous Poison, Happy Deliverance!

Bran contains few nutritious Parts, if we except the farinaceous Matter adhering to the inner Surface. Indeed, Bran contains the essential Oil of the Vegetable; but the Grain is supplied with two Membranes or Husks, the second of which is the principal Seat of the Oil; it is this Oil that imparts that agreeable Smell to brown Bread, so superior to white. In grinding the Grain, a great Part of the first Skin is divided from the second, and mixes very intimately with the rest; the first is a mere indigestible Husk, a great Part of which will be separated by rejecting a third Part of the  
Bran,



Bran, whose finer Parts being thus intermix'd, greatly facilitate the Digestion of Bread in the Stomach, by dividing its more glutinous Pulp. Any dubious Person may be convinced of the Reality of these two Teguments which envelope the Wheat, by the following Method : Take a Handful of the Grain, pour a little boiling Water upon it, and let it infuse two or three Minutes, which toughen the first Husk and disposes it to blanch the sooner, fold it in a Cloth and beat it smartly with a Stick and the Husk will separate presently.

The Author of *Poison Detected*, strongly recommends the Research into the Nature and Properties of human Aliment, and lavishly bestows his sublime Encomiums upon those who pursue such Studies preferably to trivial Subjects, such as Sea-Shells, Butterflies, &c. and (what really merits the utmost Attention,) continues to inform us,

“ That whoever can find out a Means to improve  
 “ and meliorate our common Food, or ascertain  
 “ the particular Properties of a Plant, merits the  
 “ grateful Praise of a People ; he feeds the Hun-  
 “ gry, clothes the Naked, heals the Diseased, and  
 “ diffuses Strength, Gladness and Opulence over  
 “ a Country. To attain such noble Purposes the  
 “ Good of the whole must supersede every selfish  
 “ View ; private Interest is a Sacrifice which a  
 “ patriot Bosom loves to make to the public  
 “ Emolument ; Benevolence has no partial Beams ;  
 “ 'tis the Part of a Miser to lock up a Treasure,  
 “ which, like an Angel, might go forth and bless  
 “ Mankind ; and tho' a Secret in a private Pos-  
 “ session, urged to its utmost Advantage, might  
 “ prove

“ prove a Fountain of inexhaustible Lucre, a good  
 “ Heart disdains to with-hold it from its utmost  
 “ Scope of Utility. If then, says he, at any  
 “ Time the Bread-Corn proves to be unsound or  
 “ damaged, if it must necessarily be used for hu-  
 “ man Food, rather than mix it with any noxious  
 “ Materials, let the Baker who has some Share of  
 “ Conscience add an Admixture of fine Barley-  
 “ Meal to the unsound Flour, in Proportion as it  
 “ is more or less damaged ; if a little finely ground  
 “ Rice be added, it will not be the worse for it.”

How benevolent and profound the Discovery !  
 and of what vast Importance ! What a Sacrifice  
 of Knowledge and Self-Interest is here ? Oh !  
 that any Journeyman Baker should have been so  
 amazingly stupid, as to conceal this mysterious  
 Emolument, when the Disclosure might have en-  
 rolled his Name in the mythological List of those  
 Heroes of Antiquity \*, *Cecrops, Triptolemus*, Empe-  
 ror *Fohi, Chintong*, and *Hoangti*.

Is it not surprising that he who claims the Re-  
 ward of such honourable Epithets, for instructing  
 us how to meliorate unsound Flour with Rice and  
 Barley-Meal, should refuse to describe the Means  
 to discern its poisonous Admixtures ? What Ad-  
 vantage does the Mariner reap from the Informa-  
 tion of latent Rocks, without a steering Plan to  
 avoid them ? And will any Man be so senseless as  
 place an implicit Confidence in another's meer *Ipse*  
*dixit*, in Matters of such Moment ? Let us argue  
 from Experience and beware of hasty Conclusions.  
 If the Bakers and Millers have ever been convicted

\* Vide *Poison Detected*, page 41st.

of adulterating Flour and Bread with Lime, Chalk, Whiting, and calcin'd Bones, they merit no Reprieve; but it is impious and iniquitous to condemn a Delinquent without an impartial Trial. The Accuser produces no Proofs of their Mal-Practice, except the simple Assertion, That he has seen a Quantity of Lime and Chalk in the Proportion of one to six extracted from Bread; which Argument has already been discuss'd; add, that it may possibly be a Mistake; I myself made a similar Conclusion, till Experiment convinced me of my Error. It frequently happens that Sacks of Flour are exposed to wet Weather in the Carriage, by which Means the Flour contiguous to the Insides of the Sack is moisten'd and becomes a Kind of Paste; afterwards, when the Sacks are dry and emptied, this dry Paste crumbles off amongst the Flour in little hard Particles, which when made into Dough, will not divide, but remain hard in the Loaf, and when baked greatly resemble Lime, &c. The same Accident happens more frequently from the hard Particles of Dough which adhere and dry to the Sides of the Mixing-Trough, especially if the Baker neglects to scrape them off daily and does not sift the Flour (as he always ought;) so that there is seldom any Bread made but this Appearance will be manifest in some of the Loaves.

'Tis great Pity the Author did not examine his *Granules* in a chemical Manner; but Chemistry and Physic are seldom united; a Circumstance infinitely more pitiable, as the latter can never be practis'd to the utmost Advantage without a due Know-



Knowledge of the former, for Reasons sufficiently obvious.

The Improbability of adulterating Bread with absorbent Earths has been sufficiently evinc'd, but the fix'd Credulity of some is not to be reversed with the bare Assertion of others ; and as every Person is liable to Deception in Theory, so nothing but Experiment can decide the Controversy ; therefore I shall now subjoin some plain easy Experiments, with a View to direct every Individual in the Choice of his Bread, and effectually to discover when it is mixed with Lime, Chalk, &c.

## EXPERIMENT I.

I mixed two Ounces of Whiting with as much Dough as the Bakers generally allow for a three-penny Loaf ; it was worked and baked in the usual Manner ; when baked, it appeared of a grey Colour, rather than white ; the Particles of Whiting were visible upon the Crust, the Cells in the Crumb were small, and the Whole betrayed an unusual Appearance. It was so extremely gritty, notwithstanding the Whiting had been previously ground very fine, that, in my Opinion, the most indigent Object would have rejected it ; I pour'd some boiling Water to some Slices in a Glass to soften its Texture, and then dropt in some Spirit of Vitriol, which immediately produced a violent Ebullition attended with a hissing Noise peculiar to such chemical Agents ; which was a convincing Proof of some absorbent Earth or alkaline Matter being mixed with the Bread ; for Acids

have no such Effect upon pure Bread, but run thro' it like Water thro' a Sponge. Lime, Chalk, Whiting and burnt Bones are all soluble in mineral Acids, and produce the same Phænomena if treated after the same Manner vegetable Acids produce the same Effect, such as Vinegar, Juice of Lemons, &c. but more faintly, on account of their inferior Strength. But for quicker Dispatch, it is sufficient to drop a little Spirit of Vitriol \* upon the Bread alone, and immediately the hissing Noise will arise, even if there was but the Proportion of one Dram of such Earths in a Quartern Loaf.

I cannot omit to mention a Circumstance here, which altho' trivial, yet tends to prove the Goodness of Bread. Take some Crumb of a Loaf newly baked, and without any Addition work it between the Fingers in such a Manner as to render it like a tough Piece of well-work'd Dough, then form it into the Shape of a thin Cup, or the Resemblance of a Star, with six small Cones proceeding from the Centre at equal Distances and terminating in obtuse Points; then let it be thrown with the utmost Violence against a Wall, and contrary to Expectation it will retain the Form it was made in, even after repeated Strokes: Pure Bread thus work'd acquires an Elasticity that has decided many a trifling Wager, in baffling the Efforts of the most Herculean Strength; but Bread intermixed with heterogeneous Matter cannot be re-

\* What is to be understood here of Spirit of Vitriol, is made of one Part of the strong Acid of Vitriol, (commonly called Oil of Vitriol) and two Parts of Water, mixed gradually. Acids have the same Effect with Flour previously mix'd into a thin Batter,

duced to such a Paste without great Difficulty ; for the intermediate Substance of Chalk, Lime, &c. prevents the Tenacity and Cohesion of its Parts, consequently renders it of a more friable Texture ; which under the same Circumstances cannot endure the Conflict, but falls to Pieces at the first Percussion. And what is more remarkable, such Bread changes its Colour by working it in this Manner, nearly to that of the Subject with which it was adulterated, while pure Bread retains its peculiar natural Whiteness

Having already gone thro' the Analysis of Alum and explained the Motives why Bakers frequently admix it with Bread, I shall now proceed to prove, by Experiment, when Bread is sophisticated with it, and that by the most easy Methods, as I regard public Utility infinitely more than the vulgar Imprecations of a scurrilous Baker, or the sublimer \* *Mouth-mauls* of an anonymous Doctor.

## EXPERIMENT II.

Take the Crumb of Bread, where Alum is suspected to be baked with it, put it into a Glass and pour boiling-hot Water upon it, in a sufficient Quantity to make it like Panada, and while hot, add to it a third Part of good purple-colour'd Syrup of Violets, let them stand half an Hour, stirring them frequently, and if there be Alum in the Bread, the Syrup will be changed to a Sap-Green ; if not, the Colour will be a little altered, but not green. As it is difficult to express the Colours in-

\* Vide *Poison Detected*, p. 6th.



duced by this Process, it will be more proper to add a Grain of Alum to the same Quantity in another Glass, and thus by comparing the Colours, the adulterated Bread will be easily discovered. Common Salt, Yeast and Bread, when pure, are neutral Bodies, and will not alter the Colour of Syrup of Violets; but Alum, either crude or baked, will change it green. When Bread has lain too long in Leaven and contracted an Acidity, it rather converts the Syrup red than green. The Bakers sometimes correct this Acidity with the Addition of fix'd alkaline Salts dissolved in the same Manner as Gingerbread-Bakers use them; thus, if they exceed the Point of Saturation, the predominant Alkali will change the Syrup of Violets green; the Juice of Buckthorn-berries will determine the Difference, if the fix'd alkaline Salt predominates, the Juice is converted into a Sap-green thereby, but if Alum be the principal Addition, the Juice will retain its reddish Colour. All alkaline Substances change Syrup of Violets green. The Infusion of Syrup of Violets is of such a ticklish Nature, that any saline Body, not perfectly neutral, destroys its natural Colour, which cannot be restored again like other Colours dependent on Salts.

The small Portion of Alum compounded with Bread cannot be easily discovered by any other Means; for crude Alum dissolved, mixed and baked in Bread, is decomposed in the Action and no longer retains all its former Properties, yet manifests enough to convert Syrup of Violets green; a warm Solution of crude Alum coagulates warm Milk instantly, but Alum baked in Bread in pretty large

large Proportions, will not, even if it be boiled in it for a considerable Time.

Bread made of stale Flour, or which has contracted an Acidity in Leaven, curdles warm Milk readily; hence the Source of Childrens Maladies, falsely ascribed to Bread mixed with Alum; this Opinion seems confirmed by the following Experiment.

### EXPERIMENT III.

I mixed the Solution of two Drams of Alum with the Quantity of Dough generally weighed for a three-penny Loaf; when baked, it was sliced and a sufficient Quantity of hot Water poured upon it, with a View to dissolve the Salt and Alum; this was filter'd, and into the clear Infusion I dropped a filter'd Solution of pure Salt of Tartar, which did not produce the least Contrast or visible Precipitation observable in the Analysis of Alum; warm Milk was added to this Infusion and continued in a simmering Heat some Time, without the least Coagulum, but the Addition of a Grain of crude Alum disposed it to curdle presently; yet Syrup of Violets speedily contracted a green Colour with this Infusion. I intended to separate the Salts by dissolving, filtrating, evaporating and crystallizing them in the usual Method; but the pulpy Parts of the Bread jointly pervading the Filter, frustrated the Attempt. It is evident by this Experiment, that Alum in Bread undergoes a considerable Change in the Oven; perhaps the Conversion of Syrup of Violets green, may be owing to its alkaline Base left in the Bread, when divested

divested of its Acid by means of the previous Fermentation or Fire, especially, if what the Author of POISON DETECTED asserts be true, viz. that the alkaline Particles of Wood volatilize the natural Acidity of all farinaceous baked Victuals; which, however, is a Point in Chemistry, of which I confess my Ignorance. But it is highly probable that the Acid of the small Quantity of Alum used by Bakers, being thus dissolved, admixed and baked, may be transmuted in the Operation; Chemistry affords us numerous Examples equally surprising, tho' unaccounted for. Aloes and Coluquintida lose their Bitterness by Fermentation, and the highly-acid Dregs of Vinegar yield a sharp alkaline Salt by Fire. This is certain, that Yeast united with Dough, generates an incredible Quantity of elastic Air, which being greatly rarefied by the Impulse of Fire, elevates the glutinous Mass and forms it into a spongy, cellular Substance, while the Heat of the Oven, at the same Time, evaporates the superfluous Moisture, and thus constitutes what is called *Light Bread*. The present Juncture will not permit me to determine the immediate Cause of the Decomposition of Alum in this Action; and indeed, it is sufficient to demonstrate with Certainty, that Alum thus treated, loses those pernicious Properties which are justly ascribed to it when taken internally with our Aliment in its crude State.

I have been inform'd that some Bakers elixate their Wood-Ashes, and with the clear Lixivium attemperate the prevalent Acidity of Dough, especially when mix'd with Alum: The artificial  
Scarcity



Scarcity of Flour which still subsists, compell'd the Bakers to dispense with Flour taken from the Enemy, which, in general, turned out so miserably stale, that, without some Intermedium, it was impossible to make it into saleable Bread. If these defects be remedied with such a Lixivium, we need no longer remain in Suspense by what means Alum is compos'd ; but this Practice, 'tis said, is known by Few. If Alum be divested of its Acid by this Means, it leaves its alkaline Base in the Bread, which is a fine Magistery, or *Magnesia Alba*, and which unelutriated, becomes aperient rather than astringent, like the *Magnesia Alba* of the Shops, a celebrated Medicine for young Children, and strenuously recommended by Dr. Cadogan ; but I cannot conceive any extraordinary good Effects from its Use, for the *Magnesia* of Nitre as well as Alum, is nothing but a very subtile absorbent Earth, which divested of its Salts by Ab-lution, acts as such, where there is a redundant Acid in the Stomach, or *Primæ Viæ*, the general Malady of young Children, not only in the City, but remote in the Country, where brown Bread unimpregnated with Alum, constitutes the greatest Portion of their Diet.

The Health of these innocent Objects, therefore, seems not so liable to be impair'd by the Use of *London* Bread, since Alum thus influenc'd in Baking, does not coagulate Milk, consequently cannot indurate the Diet, constipate the Lacteals, nor astringe the Intestines ; but on the contrary, it is very probable, that being divested of its mineral

Acid, and thus taken into the Stomach, it may absorb the Acidity it meets with there, which is of a vegetable Kind, and then become aperient, thro' the new stimulating Power acquir'd by such Union : This Conjecture seems greatly countenanced by the uncertain purgative Operation of all *Magnesiums*, for a small Dose will purge some Children smartly, and a larger Dose will not disturb another, under apparent similar Circumstances ; and these alternate Effects are obvious at different Periods in the same Constitutions, which may be attributed to the various Proportions of Acidity in the *Primæ Viæ* at different Exhibitions. But this is only advanc'd as a plausible Opinion, for I am not insensible how surprizingly Bodies lie conceal'd in each other, and what different Effects they produce by such Invelopement ; and whenever it shall be demonstrated, that the earthy Parts of Alum, singly consider'd, affect our Constitutions by other Means, I shall candidly acknowledge my Error ; *Humanum est errare* : And I flatter myself that none will be so partial as to misconstrue my Intentions, or accuse me as a venal Hireling of the Bakers, by attempting to vindicate them in favour of their Abuses ; I despise the alluring Bait of the first, and abhor the impious Practice of the last. The Scope of my Endeavours is to mediate the Dispute between the Bakers and the Publick, in a View to prevent the former from vending Poison, instead of Bread, and the latter from eating it. To acquit the Innocent and punish the Delinquent are equally laudable. He who alarms the Popu-  
lace

lace with idle Systems and Conceits of Poison existing in Bread, is equally culpable with the baneful Admixer. \* If the *Persian* Decree be just, which ordains the Baker to be bak'd in his own Oven for debasing publick Bread; by the same Parity of Reason, the false Impeacher should be compell'd to subsist on Bread alone, purposely poison'd with his pernicious Impurities.

*Qui Falsis Terroribus implet,  
Vivat Siliquis et Pane secundo.*

HOR.

Just as these Sheets were preparing for the Press, I was recommended to the Perusal of another Batch on Bread, piping hot from an imaginary Oven. The Title-page supports the Name of *James Manning*, M. D. which Letters the Bakers misimply as Mad Doctor. The Author inculcates the System of Poison detected, from which his entire Plan is evidently borrow'd in every Respect, except the Stile, which will ever remain an Original. The Arguments, or rather Conjectures, are generally inconclusive, and the Methods of discovering adulterated Bread erroneous. He enumerates Six Ingredients, which he says, Bakers and Millers add to Flour, viz. *Beanmeal*, *Chalk*, *Whiting*, *slak'd Lime*, *Alum*, and *Ashes of Bone*, and gives Hints of a Seventh of worse Consequence than the rest, and further adds, that the Physician will know what

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he

\* *Vide* Poison detected, Page 55.



he means, when he says its Quality is Suffocation, and that he has separated this Ingredient from Bread lately, but begs to be excus'd from naming it, lest he should teach those who with sufficient Wickedness are deficient in Knowledge

This very Expression betrays the Subterfuge of malicious Ignorance. But who can define the Limits of Envy ? Surely the Name of this Material is not suffocating ? If it can be separated why is it concealed ? *Res ipsa loquitur*. What real Physician will impeach his Conscience, by attributing the many sudden Deaths to a poisonous metallic Principle in Bread ? If white Lead be the virulent Ingredient hinted at, Credulity must banish our Reason, before we deem the Bakers such horrid Perpetrators of a Practice so repugnant to the Laws of God, of Man, and Nature ; and I challenge the Author to produce any other Ingredient cheap enough to effect the nefarious Purport of communicating Weight and Whiteness to Bread, and producing Suffocations internally. The petty Smatterer in Physic knows better, and will not dare to ascribe an immediate suffocating Quality to such infected Bread. \* Hence, whom shall we proclaim SUFFICIENT IN WICKEDNESS, AND DEFICIENT IN KNOWLEDGE ?

This Author asserts Bean-Flour to be so innocent, that Experiments have shewn it to afford a Nourish-

\* The Particles of Lead thus taken into the Stomach, must circulate in our Fluids, before they reach the Lungs and induce Suffocation. There are easy Methods to discover the white Lead in Bread, but the Description seems unnecessary.

Nourishment superior even to that of Wheat. The Publick would be greatly benefited by a Set of these Experiments. He tells us, as the Miller uses Chalk, the *London Baker* employs Whiting, which is nothing but Chalk reduc'd to fine Powder, and mix'd up with Size. This is a new Method of making Whiting. He adds, that there is a Filthiness in Bone-Ashes which is abominably disgustful. On the contrary, this is certainly the cleanest Article amongst the whole ; for when Bones are perfectly calcin'd, which require a continu'd intense Fire, they become a very pure white Earth, being divested of every Impurity which they contain'd before. Thus filthy Expressions excite filthy Ideas, which purer Reason calcines.

There is a new Scene open'd in his 14th Page, where he informs us, that as the former Ingredients render'd the Body costive, so Jallap became added to Bread to render it purgative, which gave Rise to a new Set of Men still more dangerous to the Publick, called *Bread Doctors*.

I have made some Enquiry after this Institution, and the Result is, that the Bakers never conferr'd this Degree upon any Persons whatever, except the two recited Authors upon the Subject ; the last of which, the better to prevent Confusion, was dubb'd with the additional Particle *Un*. Both were thus honour'd only, in Consideration of the stupendous Diligence so lavishly bestow'd upon the Bakers, thereby explaining the true Art and Mystery of adulterating Bread, with such inalimental Materials as were never thought of before.

In the same Page, we are told, that the Ingredients, *viz.* Chalk, &c. are certainly us'd in Bread, for he has separated all of them from it. Few will dispute the Doctor's Sagacity, but I wou'd freely give an adequate Premium to him, or any other, that was able in my Presence to extract a single Grain of crude Alum, by any Process, or Refin of Jallap as he directs, and yet one Dram of Alum and two Drams of Jalap shall be previously admix'd and bak'd in a Quartern-Loaf for that Purpose. It is a great Pity that these Authors, upon a Subject of such Consequence, should not be oblig'd to prove their Assertions before those who are vested with Authority to reward and punish according to their Merits.

The Author's Characteristics of good and bad Bread are really entertaining.

He directs us in a perfect Manner, as he says, to separate all the pernicious Ingredients from Bread; but is greatly at a Loss to determine the Adulteration of Flour; and is greatly embarrassed to discover with Certainty, when Bean-Meal enters the Composition of Bread. Therefore that no Improvement may be wanting to his second Edition; Let him remember, that those who eat such Bread are very apt to f——t soon after, and the more such Admixture, the more violent the Explosion.

I shall conclude this Subject by observing, that the Task is infinitely more facile, to discover the pretended Impurities in Bread, than to trace the real Motives which induc'd these two famous Doc-

tors



tors to impose their dissentious Arguments upon the Publick : If the Cause was want of Fame, their Design is accomplish'd ; but if they are as ignorant in Physic as Chemistry, the Want is BREAD.

*Dissentious Rogues,  
That rubbing the poor Itch of your Opinions  
Make yourselves Scabs.* SHAKESPEARE.







# THE APPENDIX.

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*Alterius sic*  
*Altera poscit Opem Res, et conjurat Amice. HOR.*

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THE Author of *Poison detected*, informs us, that the Decrease of the People is owing to the Abuses committed in making of Bread ; this Assertion is not well-grounded, for such Decrease has not yet been sufficiently prov'd, neither is it generally believ'd ; but allowing the Justness of the Sentiment, I hope it will be acknowledg'd hereafter, from the Arguments and Experiments already advanc'd, that Baker's Bread can by no Means be admitted as the primary efficient Cause. Let us take a general Survey of our common Diet, and the Manner of preparing it, together with such Diluents which are indispensably necessary to promote Digestion, and animate the human Frame, and we shall soon be convinc'd that Bread, as it is now made, is the very Antidote of that Poison which it is suspected to possess : When I reflect on the prodigious Quantities of real poisonous Matter



Matter, swallow'd down daily in Wine, Punch, Porter, Cyder, &c. I am surpriz'd that the ill Consequences have escap'd the Conception of the Populace, but it is astonishing, to think that such Observations have not produc'd the most diligent Research into the efficient Cause, by those Guardians of publick Health, whose principal Merit depends upon such intricate Knowledge. Certainly Public Calamities will never enhance private Emoluments. The Hospitals have been crowded for Years with Patients labouring under Infirmities arising from one common Source, viz. drinking too freely of unwholesome Beer or Porter, yet the lurking Poison has escap'd Discovery : If we attribute this Neglect to Ignorance, we insult their Knowledge ; and dare we ascribe it to Indolence ? Shameful ! This is the City Fountain.

*Which holds a Poison of such deadly Force. LXX.*

It is a severe Reproach upon our Intellects, and public OEconomy, when we reflect, that in this vast Metropolis, we scarce eat or drink any Thing pure and void of fraudulent Mixture, pernicious to our Health. Hence we account for the rare Instances of Longevity, and the present pigmy Race.

Notwithstanding these real Abuses require immediate Redress from those in Power, I shall not amuse the Publick with Plans for that Purpose, but think it sufficient to prove what I assert, with familiar Experiments, that every Individual may reap the same Advantages as myself. I have long conceal'd my Sentiments upon these Subjects, lest  
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the seeming Indignity should produce some Rancour in the Circle of my Acquaintance, which I flatter myself will be superseded by publick Utility, especially as no Particulars are pointed at; yet I blush to acknowledge, that the two Authors upon Bread extorted this Appendix from me with a View to expose the Chimerical Notions and frivolous Pretexts of Poison existing in Bread, and to prove more essentially the Basis of various Diseases inconsistently ascrib'd thereto.

Beer, commonly call'd Porter, is almost become the universal Cordial of the Populace, especially since the necessary Period of prohibiting the Corn-Distillery; the Suppression presently advanc'd the Price of that common Poison Gin, to near three times its former Price, and the Consumption of Beer has kept Pace with such Advance. A few Years ago, a *Winchester* Quart of old sound Porter, would yield near six Ounces of good proof Spirits by a careful Distillation; but the Beer brew'd lately, will not yield four Ounces of the same Proof; whether this be owing to the Avarice of the Brewer, or the Quality or Scarcity of the Malt, is not very pertinent to the Subject; but the Reduction of its Strength ought to be balanc'd by its Genuineness. Beer divested of its Quintessence by any Means, speedily becomes too forward and sickly, (as it is phras'd) and such Beer requires more Circumspection and Management than good sound Beer; the Loss of its spirituous Body disposes it to turn flat, so that, when thrown down (as it is call'd) or clarified with Isinglass, and afterwards drawn into proper Drinking Vessels, it will

not retain its flowery Head or Froth, the Pride both of the Victualler and Drinker. The Brewer's Coopers employ'd to rectify the usual Disorders of Beer, have invented various Methods to remedy this Defect, and at length have hit upon one which answers the Business excellently, but at the same Time proves of the most pernicious Consequence to the Constitution; Green Vitriol (commonly called Copperas) or Salt of Iron is the general *Panacea* for such Beer, a Quantity of this nauseous Styptic, from one to six Ounces, is previously dissolv'd in Milk or Beer, then mix'd up with a Solution of Isinglass, and thus added to one Butt of Beer; when by this Means it is render'd fine, and drawn into Drinking-Vessels, the Head or Froth will rise to three or four Inches above the Vessel, and will continue so for a considerable Time; the Populace commit the same Error, and are equally culpable in the Choice of their Beer, as Bread, for they will eat no Bread but what is white, nor drink any Beer but what is drawn with a Head like a Collyflower, as they term it; and there are few Victuallers but what use more or less of this prejudicial Ingredient; for I have seen large Quantities of Salt of Steel bought by various Coopers at different Times for this very Purpose. Salt of Steel differs very little from purified green Vitriol, altho' it is a Chemical Preparation of the Shops; as Alum consists of a Chalky Earth united to the Acid of Vitriol, so Copperas, or green Vitriol, consists of a martial Earth united with the same Acid, and thus only differ in their Basis as to Composition, but the last is infinitely more nauseous



and unwholesome, especially when drank in Beer, for in this Case it is not decompos'd, like Alum in Bread, before it is taken internally, but every Particle of Beer is united to a Particle of Vitriol, and is thus taken into the Stomach dissolv'd in its crude State.

It is allow'd that Salt of Steel when prudently given, proves an excellent Medicine in some Cases, but when it is daily drank in Beer, and continued a few Days, it is not difficult to conceive by what Means it may produce very acute and dangerous Diseases : It does not affect all Constitutions alike, for where there is a predominant Acid in the Stomach, it is increas'd by it, and thus sometimes in a surprizing Manner induces a most intolerable Pain in the Stomach, with a Heart-burn ; sometimes a severe Griping ensues, which at length is succeeded by a most obstinate Diarrhoea. I appeal to the common People, if they are not frequently afflicted with these Complains after drinking some Sorts of Beer. The great *Boerhaave* observes, that this Salt of Iron meeting with alkaliescent and putrid Matters in the Body, and thus having its acid Solvent drank up thereby, is turned into an astringent, ponderous, sluggish, metallic Calx, that occasions inveterate Obstructions ; and that at other Times it changes the Excrements black, and forms them to a Matter like Clay.

There is still a worse Mischief attends this Abuse, when Salt of Iron is thus consum'd in Beer, it remarkably increases the *Momentum* of the Blood, especially

especially if Exercise be us'd after it, the increas'd Velocity of the Blood heats the Body, this induces Thirst, which the Toper in vain attempts to relieve, by drinking more Beer, and thus is inadvertently hurry'd into a Debauch, attended with a most intolerable Head-Ach. The next Day a Sickness at the Stomach and an universal Languor prevails so much, that the Labourer becomes unfit for his accusom'd Exercise; he innocently accuses himself of the imprudent Excess, but remains perfectly ignorant of the immediate morbidiferous Principle.

The ill Effects attending this infamous Adulteration of Beer, need no Illustration, and if any one disputes the Practice, let him interrogate the Coopers and Victuallers, who being generally ignorant of the ill Consequences, seldom deny the Fact.

*For we have prov'd it by their Practice,*

*No Argument like Matter of Fact is.*

HUME

But if their Consciences will admit a Denial, enquire of the Chemists, What is the general Use of Salt of Steel? Who buy it? and to what Purpose? If their Reply be not sufficiently evincing, Experiment will decide the Controversy.

EXPE-

## E X P E R I M E N T.

*To prove when Beer is adulterated with Salt of Steel, or green Vitriol.*

Take one Ounce of the best blue-colour'd Galls, such as the Dyers use, powder them grossly, and boil them a Quarter of an Hour in half a Pint of Water, strain the Decoction and keep it in a Phial for Use.

Where Beer is suspected to contain green Copperas or Salt of Steel, take two Wine-Glasses, fill them with such Beer, place them in a good Light, and add a few Drops of the Decoction of Galls to one Glass, stir it well and compare it to the Colour of the Beer in the other Glass, and if it be changed the least Degree blacker, it may with Certainty be concluded, that such Beer is impregnated with some chalybeate Particles, which will appear more evidently. if the two Glasses be examined after they have remained undisturb'd twenty-four Hours; in which Case, a blackish Curd generally subsides to the Bottom of the Glass admixed with the Decoction. But for a more sufficient Proof, as the Quantity of Salt is sometimes more minute, take a Gallon of Beer and boil it gently till it be consumed to a Pint, or less, to which add some Decoction of Galls, as before, and the Effect will be more obvious: If no additional Blackness supervenes, it is evident such Beer is unadulterated with Salt of Steel. At other Times Beer is so profusely contaminated with it, that a styptic inky Taste is very perceptible after drinking it. There are various



rious other Methods to detect the Fraud, but these are most easily performed. These Salts are not the only Impurities with which Beer is debased: The strong Acid of Vitriol is preferred for different Purposes. Beer sometimes is so peculiarly stubborn, (as it is phrased) as to resist Purification with common Finings; this Defect is remedied by a previous Addition of the Acid of Vitriol, four Ounces whereof is the general Proportion to a Butt. And another secret Advantage results from this Practice; for a Butt of mild Beer is thus rendered sufficiently acid for the Victualler to gratify the stale Palate of his Customer, or to resemble what they call *Intiro Butt Beer*. In other Beer the natural prevalent Acidity is destroyed by the Addition of fix'd alkaline Salts, Soap-Lees, and calcarious Earths; the first produce an immediate Effervescence, by the Coopers called Fomentation, and when the Conflict is over, the gross Particles are more easily precipitated with the Finings. The first, in one Sense, is a venial Crime, for the Union of pure alkaline Salts with the natural vegetable Acid of Beer, produces a *Sal Diureticus*, which is not generally pernicious, as it deterges the urinary Passages and runs off quickly; however, like Alum in Bread, it has no business there. The Properties of the rest will be considered hereafter.

Sometimes, tho' seldom, Lime and Oil of Vitriol are alternately added to Beer, with a View to rectify what is term'd *Cloudy Beer*; this Mixture produces a *selenite* Salt, which hitherto has been adjudged indissoluble. If this Salt did not gravitate

to the Bottom of the Cask, in its Needle-like Shoots, I should dread the Consequences.

Hence, likewise, we can estimate the Mischiefs arising from these artful Sophistications. Miserable is the Person afflicted with a prevalent Acidity in the Stomach, who drinks beer contaminated with the Acid of Vitriol ; but he who indulges his bilious Constitution with alkaline Diluents, adds Oil to Flame. Health is an inestimable Blessing ; yet how ignorantly and willfully is it sported with ? To enumerate the Variety of Diseases which may arise from this infected Fountain, would exceed the Limits of my Intention ; they are obvious enough to those whose Judgment directs their Cure. *Sat Verbum Sapienti.*

If any public Abuse merits Redress, surely this will be first in Rank, since the unmolested Villainy must inevitably brood ten Times more Destruction than Bread made with Alum.

Milk, with a Proportion of Alum, is sometimes added, with a View to fine cloudy Beer ; at the same Time, a necessary Quantity of colouring Matter is admixed to communicate a proper Colour to Beer ; this colouring Matter is variously prepared ; the Juice of Elder-berries is the Favourite of some ; others prefer the Decoction of Logwood, or brown Sugar burnt and dissolved, in the same Manner as hasty Cooks colour their Gravy ; whilst others for Cheapness substitute what is called Wash by the Distillers, which is the Residuum of Melasses after it has been fermented and distilled. The same Method is practised by some Small-beer Brewers, to procure a commendable Colour to their pale Beer, after

after the colouring Tincture of Malt has been previously extracted by the Ale or first Worts ; all which Customs, however innoxious, ought not to be countenanc'd, but excite the Indignation of every Consumer.

There are certain Methods to detect these artificial Combinations ; but as the Description of them here might prove a tedious Incumbrance, I shall prefer what is evidently more material.

*Experiment to prove when Oil of Vitriol is admixed with Beer.*

Take one Gallon of suspected Beer, and boil it down to a Pint, as before directed ; and add to it gradually, a clear Solution of any fix'd alkaline Salt, till the Acidity is perfectly saturated ; which may be known by its Effects upon Syrup of Violets ; for if the Acid predominates it will change the Syrup redish ; if the Alkali, green : Stir the Beer, thus saturated, and dilute it with a Pint of Water ; filter and evaporate to a small Quantity ; place it in a Cellar in a flat-bottom'd China Vessel, and in a few Hours there will be perceived small Particles of a neutral Salt adhering to the Sides and Bottom of the Vessel, called *Tartar of Vitriol*, which will not appear if the Beer be free from the Acid of Vitriol ; for the natural Acidity of old Beer is of the acetous Kind, which thus would constitute a saline, soapy Magma resembling the diuretic Salt of the Shops, except in Colour, and which will not crystallize like the former.



I cannot conclude these Observations upon adulterated Beer, without giving one Instance of its ill Effects : Two Persons now living, being greatly fatigued last Summer with walking, agreed to refresh themselves with a Draught of Porter by the Way ; one drank his first Draught moderately, but in less than a Quarter of an Hour complained of a Giddiness and inward Pain, which increased so quick that he fell down as if Epileptic ; his immediate Death was expected by the Apothecary, whose Medicines, however, afforded some Relief ; mean while, the other began to complain of the same Symptoms, which were not quite so violent. He reached Home with Difficulty, and was obliged to employ his Apothecary, by whose Means he regained his Health in a few Days. They attributed their Illness entirely to the Beer, as they were both cool, and perfectly sober, having drank nothing else during their Walk, and are ready to attest the Truth of this Incident to any dubious Person.

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### *Observations on Cider.*

CIDER is a Liquor drank very plentifully during the warm Season, which is a sufficient Inducement to its Adulteration. The Want of a larger Proportion of the natural inflammable Spirit in Cider disposes it to turn of a crabbed Sour. Cider judiciously made is an excellent Liquor, and greatly exceeds in all Respects the low Wines made in *France* to answer the Intention of Beer. Cider affords

affords a noble Instance to what Advantage Wines might be made in *England*, if duly encouraged, and none are more sensible of its Value than the *English* Wine-Merchants. Cider well made will keep very well in proper Cellars for Years; but what is generally drank by the Populace is such abominable Stuff that it puzzles the greatest Artift to preserve it tolerably one Season. The fine Powder of Alabaster and Marble-Dust, as it is called, which is what the Stone-Masons rub off in polishing Marble, are frequently added to Cider; the Acid of Cider dissolves these Substances, and in Proportion to such Solution, the Remainder becomes milder thro' the Loss of the Acid, for the Acid and Earth act upon each other reciprocally. The absorbent Earths are indiscriminately used for the same Intention. The Practice became so general a few Years ago, that a certain Cooper was not ashamed to advertise a Composition of such Ingredients, enough for One Shilling, to cure twenty Gallons of sour Cider, Wine, Beer, &c. but altho' the Liquors in this Case are rendered milder, by divesting them of their superabundant Acid, yet after such Earths are dissolved, the Liquors are presently disposed to generate fresh Acidity; or if the alkaline Quality of the Earth predominates, the Liquors turn vapid or flat, and never regain the essential Spirit which they lost; and whoever drinks such Liquors, let them remember that at the same Time, they are drinking a Solution of Stones and absorbent Earths, as Chalk, Oyster-shells, Crabs-eyes, calcin'd Bones, &c. which continue dissolved no longer in the

Body than while their Solvent retains its Properties as such; for when such Liquors meet with any Thing putrid or alkalescent in the Body, which generally happens in bilious Habits, the acid Solvent will probably be destroy'd thereby, consequently the Earth will be let go, and thus lay the permanent Foundation for chronic Diseases, particularly the Stone and Gravel, if not the Gout. Let us illustrate the Argument experimentally by means of the Solution of Lime in the concentrated Acid of Sea-Salt; this Solution has been long *imposed* upon the World, under the abstruse Title of *Liquid Shell*, and artfully ascribed to the Invention of one *Schwanberg*, a *Chemist*, and republished for the sole Benefit of his only Eulogist, *W——r B——r*, Typographer.

The *Liquid Shell* here meant, may be prepared by calcining powdered Oyfter-shells in a reverberatory Furnace for a few Hours, by which Means they acquire the Properties of pure Lime; the Powder must then be flux'd with double its Weight of Sal Armoniac, by which Means the concentrated Spirit of Sea-Salt in the Sal Armoniac quits the volatile Alkali with which it was united, and dissolves the calcin'd Shells; the melted Mass is now suffered to run *per deliquium*, or more commonly is dissolved by the Affusion of hot Water, then filtred and evaporated to a due Strength, it becomes the famous Menstruum so stupidly recommended as a Solvent for the Stone and Gravel. A Medicine of similar Properties has been prepared Time immemorial, tho' perhaps unobserv'd, from the Residuum of Spirit of Sal Armoniac with Quicklime,  
treated



treated as above: The Lime Phosphorus yields the same.

The Properties of these Solutions sufficiently illustrate the ill Consequences which may arise from drinking Wine, Cider, Beer, &c. impregnated with such testaceous Earths ; for if a Solution of any alkaline Salt be added to these Solutions, the Acid of Salt instantly lets go the Earth which before it held in a transparent fluid State, and unites with the Alkali, which thus generates Sea-Salt. This is a convincing Proof, that the Solution of these chalky Earths in Acids may be easily decomposed in the human Body, the dreadful Consequences of which may be easily comprehended. If the Powder now precipitated be washed from the Salts and dried, it greatly resembles, as to Appearance, that tophaceous Earth extracted from the Joints of gouty Patients. These Substances dissolved in vegetable Acids produce the same Effects, on which Account a great deal more might be advanced in a medical View, was it not deviating from the Subject.

To prove that the *Liquid Shell* is nothing else but fine Lime dissolved in the concentrated Acid of Salt ; take an Ounce of the Solution, and add to it some strong Acid of Vitriol, which will immediately wrest the Lime from the Spirit of Salt, and produce a Precipitation, but not perfectly, because the Acid of Vitriol will not dissolve so great a Portion of such Bodies as Spirit of Salt, but the Spirit of Salt is immediately render'd volatile by this Addition, and flies off in Fumes:

The

The Dealers observe, that Cider, when treated in the Manner already mentioned, is divested of its peculiar Roughness and tastes flat; Alum is added to restore the former, and Treacle, which communicates a new Fermentation and a commendable Sweetness with a brown Face, is the general Remedy for the latter; this Addition is commonly made a few Days before it is sold to the Retailer, lest it contract a new Acidity after the Fermentation is finished; for Acids united with Absorbents never return to Acids again. If this Cider be speedily bottled, it presently becomes brisk, sparkling, and attended with that mantling, flatulent Appearance, which wins the Approbation of the Consumer. Leaden Vessels are sometimes ignorantly employed in the making of Cider and remedying its Defects; the Acid thus dissolving a Portion of Lead, is converted into a certain, destructive, slow Poison. A few Drops of the Tincture of Orpiment drop'd into such Cider changes it black, which is an infallible Method to discover it.

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### *Observations on Vinegar.*

THE best Vinegar made at the large Works about *London* is excessively bad, when compared with what is made from good Wine; which last ought to be carefully distinguished from sour Wine, Cider, &c. which notwithstanding its austere Taste, must not be accounted perfect Vinegar. When *English* Vinegar, or rather sour Ale, thro' any injudicious Treatment, does not turn out sufficiently

ficiently acid, Oil of Vitriol frequently becomes the compensative Substitute. I have experienced this to my great Detriment in some chemical Operations. The pernicious Effects resulting from the vitriolic Acid repeatedly consumed at our Meals, has been already demonstrated ; but as Vinegar is of such extensive Use in Sauces, Pickles, Salads, &c. the Public are innocently ensnared into a large Consumption of the former Acid, under the Mask of the latter ; hence proceed those violent Pains in the Stomach, Gripes and Colics after eating Salads with Vinegar, notwithstanding the Interposition of Oil, &c. which Complaints seldom arise from the liberal Use of pure Vinegar.

Good Vinegar has ever been accounted salubrious when discretionally used, especially in bilious Constitutions ; it is an experienced Preservative in epidemic Diseases. The learned *Boerhaave* judiciously extols its Efficacy in putrid Fevers, Small-Pox, and the Bites of venomous Animals, and expressly affirms that in Mortifications and Gangrenes it has no equal. He adds, that good Vinegar is so opposite to Drunkenness, that a Person almost dead drunk by the Abuse of spirituous Liquors, may be brought to himself by drinking of good Vinegar ; but these excellent salutary Qualities are not to be expected from the Use of the common sophisticated Trash made in *England*, and imposed upon the Populace under the plausible Pretext of White-Wine Vinegar.

How inestimable then is that Science which not only directs us in the Choice of what Aliments we eat



eat or drink, but reveals the iniquitous Artifice of those intrusted to prepare them.

— *As if they labour'd*  
*To bring Manslaughter into Form.* - Shake.

*Experiment to prove when Vinegar is adulterated with the Acid of Vitriol.*

Take two Quarts of Vinegar, and boil it in what is called a Stone Earthen Vessel, till about Four Ounces be left, then dissolve half an Ounce of Salt of Tartar in four Ounces of hot Water, which add to the Vinegar, filter it, put it into a Flat-bottom'd Earthen Dish or Glass, place it in dry Sand, previously put into a small Iron Pot, which put over a gentle Fire, that it may evaporate to about one Ounce; then take the Vessel out of the Sand, and put it in a cool Place for an Hour, and if there was any Oil of Vitriol in the Vinegar, it will be united with the Salt of Tartar, and thus constitute *Tartar of Vitriol*, which will be found sticking in small Crystals to the Bottom of the Vessel, and which may be easily distinguish'd by their Form and Taste, for pure Vinegar and Alkaline Salt form a *Sal Diureticus*, which appears quite in a different Manner, as before observ'd.

The Quantity of these Crystals determines the Proportion of the Vitriolic Acid.

Several Methods have been invented to rectify the Impurities of *English* Vinegar, and to concentrate its Acid; the common Method is Distillation,

tion, which, if judiciously performed in Glass Vessels, answers the Purpose very well ; but as both Chemists and Distillers for Dispatch, generally perform it in Copper Stills, with Pewter Refrigeratories, it is thus render'd worse for internal Use than it was before ; for by this Treatment it dissolves a large Portion of Metal, thro' which it runs, and Copper itself in some Processes, is elevated over the Helm by Means of Vinegar ; these Metals taken internally, prove a dangerous, and almost incurable Poison to the Body : Distill'd Vinegar is seldom without an Empyreuma, which is owing to the Inattention of the Distiller ; Vinegar unattended with this Empyreuma, after Distillation in common Stills, is generally recommended as the purest Vinegar, because the Addition of fix'd Alkalies to it, causes no Precipitation, which would certainly be the Consequence, if it contain'd any metalline Particles ; but I am convinc'd to the contrary by the following elegant Experiment : Let common Vinegar be distilled in a Glass Cucurbit, with a Plate of Lead suspended in its Head, the Vinegar thus distill'd, appears perfectly pellucid and pure, and does not manifest the least Appearance of Lead by the Addition of Alkalies ; but if a little Tincture of Orpiment be drop'd into such Vinegar, it immediately changes black, which Colour is not produc'd with pure distill'd Vinegar. This is a surprizing Experiment. Who would imagine that any of the constituent Parts of Lead could be so minutely divided, and wonderfully conceal'd in this Vinegar, as to elude the Criterion of Alkalies ? Perhaps this Tincture of

Orpiment is a Key to some other Secrets of still greater Importance.

Since *Engliff* Vinegar seldom escapes Adulteration, the ill Consequences of which are daily experienced, an easy Process for preparing good Vinegar for Family Uses, may not be improperly describ'd here ; in which Case, let the following be observ'd as a general Rule, *viz.* That the very best fermented Liquors make the best Vinegars : They mistake the Matter greatly, who attempt to prepare good Vinegar from stale acidulated Subjects, divested in a great Measure of their inflammable Spirit ; for all their natural Parts are absolutely necessary to preserve the Effence of Vinegar. The Chemical Writers abound with Processes for making of Vinegar, particularly *Glauber*, *Stabl*, and *Boerhaave* : The following is the Method I have preferr'd.

*An easy Method of making excellent Vinegar for Family Use.*

Take a Five-Gallon Cask, with a pretty large Bung-Hole at one End, season it two or three Days with common Vinegar, then pour it out, and put into it four Pounds of Raisin-Stalks, and Four Ounces of Ginger bruised, then take Four Gallons of good sound Wine or Ale, let this be just brought to boil with a very quick Fire, and immediately add it to the Ingredients ; place the Cask either in a hot Sun, or near a Fire, slightly cork'd, shaking it every Day, and in a little Time it will be converted into excellent Vinegar.

The



The Ginger and Raisin-Stalks are only added to promote the acetous Fermentation. The Furnace called an Athanor by the Chemists, is very commodious for the Purpose, for by its Means a due Degree of Heat can be given and continued at Pleasure, with very little Trouble.

There are several Methods in Use for meliorating the Acid of Vinegar, the freezing of weak Vinegar in an airy Place, defended from the Snow, is very simple and practicable, for thus by rejecting the Ice, the remainder is render'd sufficiently Acid, but as this Practice is attended with very great Waste, the Chemists have invented a Process whereby Vinegar can be strengthened at Pleasure with its own natural concentrated Acid, by which Means the Addition of a mineral Acid, becomes as unnecessary as it is unwholesome.

### OBSERVATIONS *on* PICKLES.

Pickles are the next occurrent Articles which merit a Remark, especially where Vinegar is the preserving Principle ; such Pickles whose Sale depends upon their green Colour, as Cucumbers, *French* Beans, Samphire, &c. are liable to the most infamous Abuse : The prodigious Consumption of Pickles in the Navy, as well as in private Families, has induc'd the Wholsale-Dealers to give them an enticing Green Colour by various fraudulent Arts ; Verdigrease and Blue Vitriol are previously dissolv'd by some, for this Purpose, whilst Cooks and Housekeepers, to avoid the Imputation of this odious Practice, have taken great Pains to procure

Vessels of Bell-Metal, Brass, and Copper, to boil their Vinegar in, and others with more scrupulous Diligence, have only thrown a handful of Half-pence into the boiling Liquor for the same Purpose. All these villainous Artifices answer the same End, and are all alike pernicious, except that with Blue-Stone, so called, which is certainly the most noxious, as being Copper dissolv'd in the Acid of Vitriol ; Verdigrease is nothing but Copper corroded by a vegetable Acid, and when Vinegar is boil'd in Copper Vessels, it dissolves enough of the Metal to merit no other Title.

Alum is dissolv'd in the Vinegar to procure a requisite Crispness in the Pickles, this infamous Practice is call'd *Setting*, by the Oilmen ; some of whom, with a little Remorse, substitute tinn'd Vessels in Preference to the others ; but tinn'd Vessels are not unexceptionable here, for Vinegar readily dissolves such Tinning, even if it be of pure Tin, notwithstanding the contrary Assertion of the Brazier, who being honour'd with a publick *Premium*, for lining Culinary Vessels with pure Tin, imprudently advertis'd them to withstand all the Acids us'd in Cookery ; when the simple Experiment with Apple-Sauce, would have convinc'd him of his Error ; for this Metal dissolves the soonest in the weaker Acids, which thus renders them very insalubrious.

The additional Green Colour of Pickles is discoverable by several Means ; in general they appear of a deeper Green Colour than natural ; especially Cucumbers, which frequently are gather'd with one Side whiter than the other, but when thus

artfully pickled, they appear all alike green; and in some, the æruginous Taste is plainly perceptible.

*Experiment to prove when Green Pickles are colour'd with Blue-Stone, Verdigrease, or Utensils of Brass and Copper.*

Scrape off the Outside of the Pickle, and spread it about an Inch square upon the Blade of a clean scoured Case-Knife, hold the Blade over the Fire, or the Flame of a Candle, and evaporate the Moisture very gently, then rub it off, and that Part of the Blade will appear of a Copper-Colour, if the Pickles have been treated as above. The Doctrine of Chemical Precipitation explains the Reason. A Plate of any polish'd Iron, steep'd a small Time in the Vinegar, will manifest the same Appearance, and some Pickles change of a bluish Colour, by the Addition of Spirit of *Sal Armoniac*, so as to predominate over the Acid of Vinegar.

These Abuses are very unnecessary, for the natural Green Colour of Pickles may easily be preserv'd without any fraudulent Abuse.

Those who prefer making their own Pickles, should be provided with large Earthen Pans unglaz'd, which will endure the Fire, they are easily procurable at the *Vaux-Hall* Pottery, and the Pickles should by no Means be preserv'd in common glaz'd Earthen-Vessels, as the Vinegar dissolves the Lead of the Glazing, and Sugar of Lead has been extracted from such Solution. But no such Danger attends the Use of what is call'd Stone-Ware; and the Method of strengthening Vinegar with



with its native Acid, renders the boiling of it in Pickling, at all Times unnecessary.

Hence, the utmost Caution should be observ'd, not only in the Choice of Pickles, but in preparing them for Family Use, lest they should, instead of a wholesome agreeable Sauce, consume a Portion of crude Alum, Oil of Vitriol, Lead and Verdigrease.

I shall now conclude these Remarks, without entering into a Detail of adulterated Wines, which might reasonably be expected ; a compleat Examination of their numerous Sophistications, and insalubrious Admixtures, both at Home and Abroad, together with the various Means to expose them, would fill a Volume ; and I flatter myself that the preceding Observations will be acknowledg'd a convincing Proof of the inefficacy of Alum consider'd as a Poison in Bread, when compar'd with the destructive Compounds already describ'd, which however constitute but a small Part of what might be advanc'd upon similar Subjects, at present omitted on Account of the hasty and necessary Publication of this Treatise. Were we to condescend to minute Particulars, the Pursuit of unwholesome Substitutes in the Management of our Viands, and the certain Rules to detect them, especially in those of the Opulent, would furnish us with an Idea of endless Labour ; the most ordinary Kitchen abounds with them : What Parent in his Senses, who understood the poisonous Effects of Lead, would indulge his endearing Offspring with the enticing, luscious, Blue-colour'd Paste of a Fruit-Pye, bak'd in a Pewter-Dish,

Dish, and yet regardless of Remonstrance, how voraciously do the CHILDREN of the LARGEST GROWTH devour it.

Sweetmeats and Ginger-Bread boast their pernicious incentive Allurements. Punch is frequently acidulated with the Acid of Vitriol, disguis'd with the Fragrancy of Essence of Lemons.

Old Hock, Moselle, and Rhenish Wines, have been impregnated with the Sugar of Lead, with a View to meliorate their austere Taste ; but let it be remember'd once for all, that in whatever State Lead be taken internally, it certainly will retard the Circulation of the Blood, consequently, all the Secretions, and injures the Nerves, by inducing Spasms, Convulsions, Tremblings, Difficulty of Breathing, and at length Suffocation. The Tincture of Orpiment converts these adulterated Wines instantly into a black Colour ; hence all Wines ought to be rejected, which are thus transmutable.

Instances of unregarded Abuses, seemingly trivial, are innumerable ; therefore whoever observes the Hint, pursues the Business, and elucidates the Subjects, must infallibly obtain the grateful Applause of all who are compassionately inclin'd to prevent and relieve the unhappy Afflictions of their Fellow-Creatures.

## ADVERTISEMENT.

**I**F there is any Thing contain'd in this Essay which the Reader may not perfectly comprehend, the Author will readily endeavour to explain the Difficulty to any one, who shall apply to him, at his House in East-Smithfield.









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